Appendix 3

A PROCEDURE FOR REMOVING THE EFFECTS OF AMBIENT NOISE LEVELS FROM AEROPLANE NOISE DATA

1.0 INTRODUCTION

1.1 The following information is provided as guidance material for certificating authorities on the method of removing the effect of ambient noise on aeroplane recorded noise.

1.2 This is not the only procedure which may be used and changes under certain instances may be made to it, but approval for its use in its current or modified form remains with the certificating authority.

2.0 Correction procedure

2.1 Aeroplane sound pressure levels within the 10 dB down points should exceed the mean ambient noise levels determined in section 7.5.6 of the manual by at least 3 dB in each one-third octave band or be corrected by the following or similar method.

1) The identification of the pre-detection and post-detection noise are made, i.e.:

   a) one which adds to the recorded noise data on an energy basis, such as that from extraneous acoustic background noise signals or electrical noise from the microphone pre-amplifier and tape recorder is termed pre-detection noise; and

   b) one which is non-additive but masks the aeroplane noise signal, such as would be produced by the presence of a lower level 'window' of the signal analyser, is termed post-detection noise.

2) Over the frequency range of the pre-detection noise, the background noise is subtracted from the analysed noise on an energy basis.

   a) at frequencies of 630 Hz and below, if the analysed level is within 3 dB of the background pre-detection noise level ('masked' band), the corrected aeroplane noise is set equal to the pre-detection background level. If the analysed level is less than the background level, no changes are made to this level; and

   b) at frequencies above 630 Hz, if the analysed level is within 3 dB or less than the pre-detection noise level, these levels are also identified as 'masked' and are corrected as in Steps 4), 5) and 6).

3) The remaining bands which fall inside the frequency range of the post-detection background noise are uncorrected unless they are within 3 dB of the identified post-detection noise, these bands are thus identified as 'masked' bands.

4) The 'as measured' spectrum is normalised to reference day conditions (25 C, 70% RH) and a distance from source of 60 m.

5) For the 'masked' high frequency bands at 60 m a linear extrapolation from the next lower frequency unmasked band of 0 dB/one-third octave, or a greater slope if derived from measured data, is applied.

6) The normalised spectrum is then converted back to 'as measured' distances and atmospheric conditions.

Note: If 'masked' pre- or post-detection bands are surrounded on both sides by 'unmasked' bands, no corrections are applied.

2.2 The following procedure is applicable to measured data where more than seven consecutive one-third octave bands are masked during a period of the noise time history.

Corrections by extrapolating in the time domain for frequencies above 630 Hz are made by taking into account propagation distance (spherical divergence and atmospheric attenuation) relative to the first (approaching) or last (receding) unmasked sound pressure level measurement in the one-third octave band requiring correction.

Source directional characteristics in each masked frequency band are assumed to be either:

a) directional, as supported by the applicant's test data or in the absence of such data; or

b) omnidirectional.